MORPHOPHONEMICS OF SWAHILI VERB SUFFIXES*

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This exhaustive treatment of morphophonological processes in Swahili verb suffixes assumes that the morphophonemics of a language is a part of its overall phonological system. Two cases of alternation in Swahili verb suffixes are discussed which reflect responses of the phonology to historical pressures from outside the phonology. An analytical problem in the derivation of Swahili's passive morphology is claimed to arise from the communicative problem of keeping the passive distinct in all contexts. An influx of loan words has likewise put pressure on the phonology to maintain some sort of order that will facilitate communication. Though these processes are not 'natural' in the same sense that strictly phonological rules are claimed to be, they are certainly 'natural' in their own way. More importantly, they should tell us just as much about the nature of phonological systems as rules that reflect phonetic constraints.

1. Introduction

Since the days of the Neogrammarians in the late 19th century, the study of phonology has consistently emphasized the extent to which phonological patterns and processes can be accounted for in terms of phonetic parameters. In recent years there has been a renewed attempt to have phonetics explain as much of phonology as possible (Donegan and Stampe [1979]; Hooper [1976]; Dinnsen (ed.) [1979]; O'Par [1974]). It is important to keep in mind, however, that the phonology of a language is a system that must respond to a great many factors besides phonetic ones. In the study that follows we discuss two cases of alternations in Swahili verb suffixes that seem to reflect responses of the phonology to historical pressures from outside the phonology. Along the way we shall present our synchronic analysis of these two problems (as well as of the Swah-

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hili verb suffixes in general) and also sketch a somewhat speculative scenario for how these patterns arose and why.

The first problem is an alternation in the passive of the Swahili vocabulary from native Bantu stock. We propose that the pattern of alternations and their dialect distribution suggest a response of the phonology to the communicative problem of keeping the presence or absence of the passive distinct in all contexts.

In addition to diachronic pressures on the phonology, social factors have exposed Swahili to an influx of loan words. To be used comfortably by speakers, loan words must be assimilated somehow into the phonological and grammatical structure of the language (Weinreich [1966]). In this way factors quite external to the language and unrelated to phonetics put pressure on the phonology to "create some rules"--to impose some kind of order that will enable communication between speakers to proceed efficiently. Yet the rules that serve this function should tell us just as much about the nature of phonological systems as rules that reflect phonetic constraints.

2. Alternations in the Suffixes on Bantu Verbs

A simple Swahili main verb has the form shown in (1). The stem is followed by a mood marker -a and preceded by a tense prefix and subject prefix.

(1) ni-na -som -a
    'I am reading'

In the passive, a -w- is normally inserted between the stem and the mood marker:

(2) kitabu hiki ki-na -som -w -a
    'this book is being read'

In certain cases, however, the passive form contains ...i (or ...e depending on the quality of the final stem vowel) preceding the w, as shown in the next two examples:

(3) a -mo -chuku-a kitì
    'he has taken a chair'
Swahili Verb Suffixes

(4) kiti hiki ki-me -chuku-liw -a
chair this it-perf-take -pass-indic
‘this chair has been taken away’

The first descriptive problem for us to examine is simply the nature and origin of this li. Yet, since most published accounts of Swahili incorrectly assume this to be the same alternation as is found with the applied, causative and stative suffixes on the verb, we shall first examine in the next section the behavior of derivational affixes other than the passive. Then we shall return to the passive with our own analysis.

2.1 Suffixes other than passive on Bantu vocabulary. In addition to the passive, there are four other fully productive suffixes on Swahili verbs (see Port [1972] and Port [1981] for discussion of the meaning of these affixes). Three of these suffixes exhibit alternations that superficially resemble the passive problem above and are displayed in columns 1-3 in Table 1.

<table>
<thead>
<tr>
<th>Verb Suffixes</th>
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<tbody>
<tr>
<td>Indicative</td>
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<tr>
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<tr>
<td>1</td>
</tr>
<tr>
<td><strong>A.</strong></td>
</tr>
<tr>
<td>vunja 'break'</td>
</tr>
<tr>
<td>piga 'strike'</td>
</tr>
<tr>
<td>taka 'want'</td>
</tr>
<tr>
<td>futa 'wipe'</td>
</tr>
<tr>
<td>soma 'read'</td>
</tr>
<tr>
<td>lefa 'bring'</td>
</tr>
<tr>
<td>tawala 'rule'</td>
</tr>
<tr>
<td><strong>B.</strong></td>
</tr>
<tr>
<td>chukua 'take'</td>
</tr>
<tr>
<td>sikia 'hear'</td>
</tr>
<tr>
<td>potea 'get lost'</td>
</tr>
<tr>
<td>ondoa 'remove'</td>
</tr>
<tr>
<td>zaa 'bear' (child)</td>
</tr>
</tbody>
</table>

Table 1: Verb Suffixes

In section A it can be seen that these suffixes are inserted between the stem and the verb-final mood marker -a. This verb-final suffix changes to -e in the subjunctive and -i in the present negative, but will no longer be separated in the examples. The examples in columns 2, 3 and 4 in section A show that the three |E-group suffixes, applied, causative and stative, all be-
gin with the vowel i or e. Throughout this paper, we shall refer to these three suffixes as the IE-group since they have many properties in common. In fact, stems whose last vowel is i, a, u take IE-group suffixes with i while stems ending in the mid-vowels e or o take suffixes in e. Comparison of the same columns in Section B reveals that when the stem ends in a vowel, rather than a consonant, these suffixes begin with i followed by the assimilating vowel i/e. These alternations can be readily accounted for with a generative analysis that posits underlying suffixes of the form -IE-, -IE5-, -IEk-, where E is an e vowel that assimilates by rule with the height of the final stem-vowel. We then need to postulate a second rule that deletes i after stem-final consonants, a rule otherwise motivated by the absence of any such clusters elsewhere in the language.

Looking now at the Reciprocal forms in column 4, we find a much simpler pattern. An is suffixed on both the consonant and vowel-stem verbs. Since the word-stress always remains on the penultimate syllable, the stress shifts to the suffix here as well as for the IE-group suffixes.

We postulate, then, both stems ending in consonants and vowels (e.g., som and chuku) and suffixes beginning with both (ie and an). In addition, there are two relevant rules which, at this point, could apply in either order: vowel assimilation and i-deletion.

1The only apparent exceptions to the constraint against consonant clusters lie in the orthographic form of some loanwords such as blanket, 'blanket'. These are normally pronounced as though spelled bulanketi (also burangeti).

2The absence of /l/ before the reciprocal suffix an thus prevents a synchronic analysis of these suffixes that recapitulates their presumed history [Meinhof 1932]: originally the alternating /l/s were in stem-final position (as in čuku) rather than our present čuku) and were deleted only when following the penultimately stressed vowel.
The e in certain affixes (marked here as E) assimilates to the height of the stem final vowel.

After a consonant, l is deleted.

In terms of this analysis we can derive the following examples:

<table>
<thead>
<tr>
<th>Verb Form</th>
<th>Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>som -IE -a</td>
<td>chuku-IE -a</td>
</tr>
<tr>
<td>read-app-indic</td>
<td>take -app-indic</td>
</tr>
<tr>
<td>somea</td>
<td>---</td>
</tr>
<tr>
<td>---</td>
<td>chukulia</td>
</tr>
<tr>
<td>somea</td>
<td>chukulia</td>
</tr>
</tbody>
</table>

All of the forms in Table 1 can be derived with this set of rules. With this background, then, we can now return to the problem posed in sentences (2) and (4) to determine if these alternations of the passive follow the same pattern.

2.2 The passive of Bantu verbs. Although many published accounts of Swahili have suggested that the passive has the same alternations as those described above (Polomé [1967:86]; Loogman [1965:123]; Sacleux [1909:115]), (that is, that the Iw variant appears after any vowel-stem), this is not in fact the case. It should be noted first, in regard to the vowel-stem verbs, that there is some difference between dialects here, which has certainly contributed to the confusion. We assign primary importance to the older and more widespread pattern (i.e., in Northern dialects) which, as it happens, is not the pattern found in the standard language based on Kiunguja, the dialect of Zanzibar town.

In order to make this point quite clear, we present the complete pattern of passive morphology in Table 2.

In section A it can be seen that all consonant-final stems suffix w before the mood marker. Interestingly there appear to be no Bantu stems ending in r, l or w. The first two were deleted in this position historically. However, it is not the case that all vowel-final stems take the Iw suffix
Table 2: Variants of the Passive in Swahili

<table>
<thead>
<tr>
<th>Active</th>
<th>Passive</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. vunja 'break'</td>
<td>vunjwa</td>
</tr>
<tr>
<td>piga 'strike'</td>
<td>pigwa</td>
</tr>
<tr>
<td>soma 'read'</td>
<td>somwa</td>
</tr>
<tr>
<td>pasa 'oblige'</td>
<td>paswa</td>
</tr>
<tr>
<td>fanya 'make'</td>
<td>fanywa (/fanwa/)</td>
</tr>
<tr>
<td>ita 'call'</td>
<td>itwa</td>
</tr>
<tr>
<td>B. chukua 'take'</td>
<td>chukuliwa</td>
</tr>
<tr>
<td>fungua 'open'</td>
<td>funguliwa</td>
</tr>
<tr>
<td>ondoa 'remove'</td>
<td>ondolewa</td>
</tr>
<tr>
<td>bomoa 'smash'</td>
<td>bomolewa</td>
</tr>
<tr>
<td>C. sikia 'hear'</td>
<td>sikiwa</td>
</tr>
<tr>
<td>ingia 'enter'</td>
<td>ingiwa</td>
</tr>
<tr>
<td>pokea 'accept'</td>
<td>pokewa</td>
</tr>
<tr>
<td>D. zaa 'give birth'</td>
<td>zawa (zaliwa)</td>
</tr>
<tr>
<td>twaa 'take up'</td>
<td>twawa (twaliwa)</td>
</tr>
<tr>
<td>kataa 'refuse'</td>
<td>katawa (kataliwa)</td>
</tr>
<tr>
<td>andaa 'put in order'</td>
<td>andawa (andaliwa)</td>
</tr>
</tbody>
</table>

Before the mood marker. In section B there are u and o final stems like chukua with IE preceding the w. But in the next two sections, C and D, we find vowel-final stems with a simple w. The pattern in C is also found for the applied form of all verbs, since they also end in i or e. The a final stems of section D, however, are a special problem since the passive of zaa is zawa in nearly all Swahili dialects (Sacleux [1909:114]), whereas in the prestigious dialect Kiunguja zaliwa is the passive of zaa. Thus we conclude that this is an innovation of this dialect.

In summary, the passive is different from the applied, causative and stative suffixes in two ways. First, the initial I is not found after all stem-final vowels, but rather only after u, o and in Kiunguja, also a. Secondly, the applied, causative and stative suffixes have the assimilating E in all contexts, whereas the vowel of the passive occurs only after the round vowels, the same contexts in which the I alternates. This question of the morphological and phonological character of the -Ii- in chukuliwa poses an analy-
tical problem that has been resolved in one of two basic ways in descriptions of Swahili.

2.3 Analysis of the Bantu passive.

2.3.1 Analysis 1: morpheme combination. In one solution it is postulated that the passive of these verbs is used only with the applied suffix as well (Sacleux [1909:114]; Polome [1967:86]). Thus, the applied form of -chukua is chukulia, but its passive will be chukuliwa -- a form identical to the apparent simple passive. Although they are homophonous, they cannot have the same morphological structure, however, since their meanings can be shown to be different. For the case of a typical verb like fanya 'make', sentences (8a) and (8b) show the usual relation between active and passive:

(8) a. a -li -fanya kiti
   he-past-make chair
   'he made a chair'

b. kiti ki-na -fany-wa
   chair it-pres-make-pass
   'the chair is being made'

Sentence (9a) illustrates the applied form of fanya, which in this case adds an indirect object or beneficiary role.

(9) a. a -na -ni-fany-ia kiti
   he-pres-me-make-app chair
   'he is making me a chair'

b. ni-na -fany-i -wa kiti
   I -pres-make-app-pass chair
   'I am having a chair made for me/I am being made-for a chair'

c. kiti ki-na -fany-i -wa...
   chair it-pres-make-app-pass
   'a chair is being made for/with/at...'

In the applied passive, in (9b), the indirect object role may appear in subject position. The direct object may also still appear in the subject position, as shown in (9c). This last sentence, however, is not semantically complete without further context because the applied suffix means that some additional role is played in the event whose precise nature must be inferred from lexical meanings and the context (Port [1981]). Since this sentence in isolation provides no hint about that role, it leaves the reader-listener up in the air. The
important point for our purposes is, therefore, that the meaning of the applied morpheme is clearly present in (9c) even though one is not given sufficient information to interpret it here.

This is not the case with the u/o stem verbs. Thus (10a) is comparable to (9b) in containing the applied meaning, but (10b) does not share the semantic incompleteness (nor the implied additional role) of (9c).

(10) a. ni-me -chuku-li -wa ki+i
I -perf-take -app-pass chair
'I have had a chair taken for me'

b. ki+i ki-me -chuku-liwa
chair it-perf-take -passive
'the chair has been taken'

In short, while (10a) will be interpreted as the applied passive, (10b) can be read as simply passive in meaning.

If one of the goals of linguistic analysis is to discover how languages serve as communication devices, we are forced to reject the analysis of u/o stem passive as simply w added to the 'applied form'. If the meaning of the applied is absent, then we cannot claim that the morpheme is present. This is to reaffirm that morphemes are not just phonological patterns, but meaningful signals.

2.3.2 Analysis 2: passive allomorphs. The second alternative is, of course, to propose that the !E in Table 2b and D is in some way part of the passive morpheme itself. In this way, one adopts a phonological rather than morphological solution. Ashton [1944:223] adopts an allomorph version of this approach. She has, in fact, nine different classes of verbs, each of which "takes" a particular variant of the passive. In a generative version of this approach, one might first propose an underlying suffix of the form !Ew with deletion rules for both the l and E everywhere but after stems ending in the round vowels and (for southern dialects) a. Such an analysis, however, faces several problems, among which is the derivation of consonant final stems, as shown in (11):

(11) | pig-!Ewa | Rule |
   | pig-liwa | (5) vowel assimilation |
   | pig-iwa | (6) l-deletion |
   | pig-wa | ?? |
Postulating underlying |Ew for the passive, both vowel assimilation and 1-deletion can operate as for the |E-group suffixes, but how can we get rid of the vowel by phonological rule to yield correct pigwa without blocking a true surface form pigiwa, the applied passive (as also seen in (9b))? It would be more reasonable to assume the |E is deleted as a unit as in (12), although the environment for its deletion is lacking in motivation since the group of unrounded vowels plus all consonants is not a natural class.

\[(12) \quad |E + \emptyset / \left\{ \begin{array}{c} C \\ +voc \\ -round \end{array} \right\} \quad [\text{in the passive suffix}] \quad (|E \text{ is deleted after unrounded vowels when passive w follows.})\]

In this way the | and E deletion are combined into a single rule (correct, as posited here, only for the northern dialects with passives like zawa). To return to the example in (11), then, pigwa could be derived from underlying pig-|Ew-a by rule (12) since the |E in the passive follows a consonant. The examples in (13) illustrate further use of the rule.

\[(13) \quad \text{siki-|Ew} -a \quad \text{chuku-|Ew} -a \quad \text{chuku-|E -|Ew} -a \]

\text{hear-pass-mood} \quad \text{take -pass-mood} \quad \text{take -app-pass-mood}

\text{|E-deletion} \quad \text{|--} \quad \text{|E-deletion}

\text{sikiwa} \quad \text{chukuliwa} \quad \text{chukuliwa}

For the passive of sikiia 'hear', underlying |E is deleted since it follows a non-round vowel, i. In the passive of chukua, however, the |E of the suffix follows a round vowel, preventing application of the deletion rule (12); thus, the vowel harmony rule yields the output chukuliwa. The passive of the applied form of chukua has two distinct |E sequences in the underlying form. The first |E is not deleted since rule (12) is restricted to the passive marker while the second |E in the passive suffix is deleted since it follows a nonround vowel. Thus, it turns out that the applied passive and the passive of stems like chukua ending in rounded vowels are homophous.

But the rule in (12) has certain drawbacks—even if it does describe the facts correctly. A major problem is that, although the rule bears some resemblance to the |-deletion rule for the stative, applied and causative suffixes, it differs in totally ad hoc ways. It deletes not just a consonant but a whole syllable and does so not just after consonants but after a most peculiar set of
vowels as well. Thus, while this analysis makes the underlying passive resemble the IE-group suffixes (since all now begin with the IE sequence), it complicates the grammar elsewhere with its own idiosyncratic deletion rule and no rationale is implied to suggest why the alternation rules for the passive versus the others should be so different. Thus the rule is not only "phonologically unnatural" [Donegan and Stampe 1979] but has no apparent motive or function in the language.

In fact, turning the problem away from deletion analyses, it is not hard to find a rationale for why something should be inserted before the simple passive w in the context after a rounded vowel. Without something there, we would have the sequence uwV or owV. The insertion of IE solves a communicative problem for Swahili: how to make sure that the presence or absence of the passive morpheme is perceptually distinct.

Our conclusion is that the IE in such examples must be morphologically related only to the passive, since the applied meaning is not present. Still it cannot be made part of the underlying form of the passive marker since any rules that would delete the IE must, as we have seen, be extremely awkward and ad hoc.

2.3.3 Our analysis: IE insertion. Given this situation, it seems to us far more sensible to postulate a rule that inserts IE wherever the passive w would occur immediately after the round vowels u and o. As noted above, the rule for assimilation of the E is, of course, the same as for the regular derivational IE. The rationale for such a solution is that the presence of the w is not contrasted anywhere in the production or perception of present day Swahili after the round vowels. As we shall see later in this section, this results in neutralization of the active-passive contrast for these verbs since /chukua/ would be phonetically identical to /chukuwa/.

A completely general process in Swahili neutralizes glides after [-low, aback] vowels. That is, the presence or absence of w and y is imperceptible after u/o and i/e respectively. This is attested in a number of orthographic distinctions based on phonemics which are phonetically indistinguishable. Thus, ku-wa 'to be' is homophonous with kua, 'grow', just as ali-ya-piga
'(the thing) which he hit [N class singular object]' is homophous with ali-o-piga '(the thing) which he hit [M-Mi class singular object]'. A native speaker of Swahili, Muhammad Ali [1966], argues that if the orthography is to be consistently phonetic, which it is for the most part, then it should be purged of all non-phonetic contrasts. It is his view, for instance, that both ku-wa 'to be' and kua 'grow' should be written with the back glide.

A consequence (in theory) of glide neutralization is that indicative forms of verb stems with final rounded vowels would be homophous with their passive counterparts if IE did not intervene between stem and passive suffix. That is, indicatives chuku-a and ondo-a would be homophous with passives *chuku-wa and *ondo-wa respectively. With the exception of the innovative Kiunguza dialect where IE follows a as well as u and o, it is exclusively after rounded vowels where IE occurs. The insertion of IE thus serves to disambiguate otherwise homophous indicative and passive verb forms.

We do not claim that glide neutralization is sufficient to explain the insertion of IE. There are cases of glide neutralization elsewhere in the language where the insertion of IE or any other element is not called upon to disambiguate homophous forms. The real catalyst underlying IE insertion is the serious communicative problem that would result if passive and indicative verb forms were homophous. Any form of ambiguity acts as a force which works in opposition to the communicative function that a language serves, and in certain instances this force may be so strong as to motivate a linguistic response. We contend that homophony between passives and indicatives in Swahili is a case in point and that it is resolved by the insertion of IE. We now turn to the historical facts for insight as to why IE in particular would be epenthesized.

2.4 Historical /I/ deletion. The historical process by which stem final /'s were lost in certain contexts and reanalyzed as suffix initial in others is often cited in the Bantu literature (Meinhoff [1932]; Polomé [1967]). Synchronic chuku 'take', was once *chukul; za 'bear', was *zal; ondo, 'remove' was *ondol; etc. Apparently, with the exception of certain loanwords, all synchronous vowel-final stems (see Table 2B) are derived from historical /I/-final stems. Thus all verb stems were at the earlier stage consonant-final.
The data in (14) below shows that historical indicative and reciprocal verb forms lost the segment / altogether, while in stative, applied and causative forms, the stem final / was reinterpreted as suffix-initial.

(14)

<table>
<thead>
<tr>
<th>Verb Form</th>
<th>Historical</th>
<th>Synchronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicative</td>
<td>*chukul-a</td>
<td>chuku-a</td>
</tr>
<tr>
<td>Reciprocal</td>
<td>*chukul-an-a</td>
<td>chuku-an-a</td>
</tr>
<tr>
<td>Stative</td>
<td>*chukul-Ek-a</td>
<td>chuku-IEk-a</td>
</tr>
<tr>
<td>Applied</td>
<td>*chukul-E-a</td>
<td>chuku-IE-a</td>
</tr>
<tr>
<td>Causative</td>
<td>*chukul-Esh-a</td>
<td>chuku-IEsh-a</td>
</tr>
<tr>
<td>Passive</td>
<td>*chukul-w-a</td>
<td>chuku-IEw-a</td>
</tr>
</tbody>
</table>

It would be difficult to argue that the / which occurs in synchronic passives such as chuku-IEw-a is likewise the product of reanalysis since the assimilating vowel does not occur in the presumed historical passive form of *chukul-w-a. It might be argued that E was subsequently epenthesized, giving synchronic chuku-IEw-a, maintaining that the morpheme boundary simply shifted to the left as in stative, applied and causative suffixes. However, such an analysis offers no explanation for the application of epenthesis only after stems which end in certain vowels, u and o (and a in Kiunguja), but not others.

By making the contrary assumption that historical passives did not acquire an initial / via reanalysis, motivation can be found for the synchronic forms. We instead reconstruct passives as having undergone historical / deletion in the same manner as indicatives and reciprocals.

(15) Before /-deletion | After /-deletion | Synchronic
*chukul-w-a | *chuku-w-a | chukulEwa
*ondol-w-a | *ondo-w-a | ondoEwa
*sikil-w-a | *siki-w-a | sikiwa
*pote-w-a | *pote-w-a | potewa
*zal-w-a | *za-w-a | zawa (Kiunguja zaliwa)

Stems with vowel-final a, e, i, o, u are given in (15). Observe that the first two forms after /-deletion, that is chuku-w-a and ondo-w-a contain IE in their synchronic manifestations. As stated previously, in synchronic Swahili the latter reconstructions would be indistinguishable from their indicative counterparts, chuku-a and ondo-a, due to a completely general process of glide neutralization whereby the presence of w after rounded vowels is imperceptible. We hypothesize that in order to avoid the resultant ambiguity between indicatives and those passives ending in rounded vowels, speakers at
some point adopted a strategy of circumlocution.

We may speculate that the point at which the presence or absence of the passive suffix was being neutralized by phonological change, speakers may have employed morphological circumlocutions to avoid ambiguity. Such a stage could have arisen either when was variably deleting and -ua vs. -uwa were already neutralized or when -ua vs. -uwa were in the process of neutralizing and the in words like *chukulwa was already gone.

By circumlocution we mean that speakers consistently modified their choice of morphological signals in order to avoid another morphological ambiguity that results from a phonological neutralization. For example, imagine a hypothetical dialect of English in which final /-θ/ and /-θs/ clusters both reduce to /-fs/. This would result in a neutralization of the morphological contrast between, for example, fifth and fifths. One can easily imagine that there would be situations where speakers of such a dialect would avoid ambiguous sentences like "Bring me the /fifs/ from the car" by saying, for example, "Bring me that /fifs/" or "Bring me those /fifs/". We hypothesize that Swahili speakers may have in a similar way taken to using the applied-passive form of the -u and -o stem verbs when the simple passive would have sufficed in order to avoid the ambiguity of the passive suffix. The meaning of the applied suffix is, after all, quite general and some interpretation of it can be found for a wide variety of contexts (see Port [1981] for discussion of the meaning of this morpheme). Thus, in contexts in which speakers wished to say "The chair has been taken" (as in (10b)) speakers instead would say "The chair has been taken by/or/to/with someone or something". After all, lexical specification of this added role is not always necessary (see Port [1981]). Presumably such a morphological "gimmick" could not last long, so that almost as soon as it became institutionalized, the IE morpheme became semantically "bleached" to its synchronic contentless state. The circumlocution then became a rule of phonologically motivated insertion of a semantically null syllable.

2.5 Conclusion. We have shown that modern Swahili has a passive suffix consisting of a simple w but that after stems ending with u or o, a semantically empty IE suffix is inserted. We have argued that this element serves
to prevent phonological neutralization of the presence or absence of the passive suffix. This rather strange rule demonstrates the importance of the communicative needs of speakers in structuring phonological change.

The rules discussed thus far account for the combination of verb suffixes for the Bantu vocabulary of Swahili, but are insufficient to account for many verbs borrowed from Arabic and English. We shall demonstrate in the next section that these other verbs require the same underlying forms for the affixes themselves but need several rules that modify the stems of the loan words in order to "Bantuize" them. In addition there is evidence for yet another rule for the insertion of a semantically null IE.

3. Special Behavior of Foreign Vocabulary

There are a great many loan verbs in Swahili that behave quite differently with respect to the set of verb suffixes. These are vowel-final stems in /i,e,u/ which require several special rules. The complexity of these rules is in sharp contrast with the simplicity and generality of the rules posited to account for Bantu originals. Although the additional rules that will be postulated in this section are restricted to loanwords, their generality within that context is attested by their power to predict the forms that new borrowings will take. We further maintain that this complexity is justified by the nature of loanword assimilation in Swahili. In fact, it is to be expected that when the phonologies and morphologies of two languages collide, strange things can and do happen. However, we are not so insistent that this complexity be formulated in terms of the generative morphophonological rules that we have postulated.

3.1. Word final epenthetic vowel in loan words. The most prominent trait of borrowed vocabulary is illustrated below:

\[
\begin{align*}
(16) & \quad \text{a. } tu-na & \quad \text{tu-na} - som - a & \quad \text{tu-na} - jaribu \\
& \quad \text{we-pres-read-indic} & \quad \text{'we are reading'} & \quad \text{we-pres-try} \\
& \quad \text{'we are trying'} \\
& \quad \text{b. } tu - som & \quad \text{tu-jaribu} & \quad \text{we-try} \\
& \quad \text{we-read-subj} & \quad \text{we-try} & \quad \text{let's try'} \\
& \quad \text{'let's read'} \\
& \quad \text{c. } ha - tu - som - i & \quad \text{ha - tu-jaribu} & \quad \text{neg-try} \\
& \quad \text{neg-we-read-neg} & \quad \text{neg-try} & \quad \text{'we don't try'} \\
& \quad \text{'we don't read'} \\
\end{align*}
\]
In the left hand column we find the normal pattern of mood markers; a in the indicative, e in the subjunctive and i in the "present negative". The class of loan words illustrated in the second column, however, has no mood marker at all. Although this feature is, of course, always remarked upon in the grammars, several other special morphological characteristics of these words have not been correctly described previously.

We shall treat borrowed verbs like jaribū as ending in a special diacritically marked vowel that will be represented as  V  and which occurs only in stem-final position in these words. Although there may be a variety of historical sources for this vowel, it is most often, as in jaribū 'try' and rikodi 'record', an epenthetic vowel added to a consonant-final borrowed verb stem to make the word fit Swahili syllable structure. It will be shown that several productive rules in Swahili make reference to  V . The first of these, illustrated above in (16) is:

\[(17) \text{Mood } \rightarrow \emptyset/V \quad (\text{The mood marker is deleted immediately after } V.)\]

If any of the other productive verb suffixes is added to these stems, of course the mood marker appears after them, but the form of the other suffixes is generally different from what would be predicted from the rules for the Bantu stems.

3.2  IE-group suffixes. Table 3 presents the suffixed forms of  V -final stems divided into four classes (A-D), depending on the final  V  and the segment preceding  V . Columns 2-4 show forms with the three  IE-group suffixes and columns 5-6 show the reciprocal and passive. Since the  IE-group suffixes exhibit the same morphophonemic variants, it will suffice to discuss Column 1 as representative of the three. Thus, looking first at fasiria , the applied form of fasirī , we might propose, for example, that the final  ī  of the stem has become the applied suffix (so that the mood marker reappears according to (17)). What seemed to be a stem vowel has become an affix. We might say that a morpheme boundary has appeared to the left of the  V . Notice, however, that the "suffixed" vowels in kejejīa and rikodiā violate the vowel assimilation rule for the regular stems, thus preventing an analysis that first deletes  V  and then adds  IE , which by previous rules becomes /i/ or /ə/. For this reason, one would prefer to say that it is still the stem final vowel.
<table>
<thead>
<tr>
<th>IE-group</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>fasiri</td>
<td>'translate'</td>
<td>fasiria</td>
<td>fasirisha</td>
<td>fasirika</td>
<td>fasiriana</td>
<td>fasiriwa</td>
</tr>
<tr>
<td>kejeli</td>
<td>'put s/o on'</td>
<td>kejelia</td>
<td>kejelisha</td>
<td>kejelika</td>
<td>kejeliana</td>
<td>kejeliwa</td>
</tr>
<tr>
<td>rikodi</td>
<td>'record'</td>
<td>rikodia</td>
<td>rikodisha</td>
<td>rikodika</td>
<td>rikodiana</td>
<td>rikociwa</td>
</tr>
<tr>
<td>ripoti</td>
<td>'report'</td>
<td>ripotia</td>
<td>ripotisha</td>
<td>ripotika</td>
<td>ripotiana</td>
<td>ripotiwa</td>
</tr>
<tr>
<td>samehe</td>
<td>'forgive'</td>
<td>samehea</td>
<td>samehesha</td>
<td>sameheka</td>
<td>sameheana</td>
<td>samehewa</td>
</tr>
<tr>
<td>starehe</td>
<td>'be at rest'</td>
<td>starehea</td>
<td>starehesha</td>
<td>stareheka</td>
<td>stareheana</td>
<td>stareheowa</td>
</tr>
<tr>
<td>jaribu</td>
<td>'try'</td>
<td>jaribia</td>
<td>jaribisha</td>
<td>jaribika</td>
<td>jaribiana</td>
<td>jaribiwa</td>
</tr>
<tr>
<td>amuru</td>
<td>'order'</td>
<td>amuria</td>
<td>amurisha</td>
<td>amurika</td>
<td>amuriana</td>
<td>amuriwa</td>
</tr>
<tr>
<td>hofu</td>
<td>'fear'</td>
<td>hofia</td>
<td>hofisha</td>
<td>hofika</td>
<td>hofiana</td>
<td>hofiwa</td>
</tr>
<tr>
<td>busu</td>
<td>'kiss'</td>
<td>busia</td>
<td>busisha</td>
<td>busika</td>
<td>busiana</td>
<td>busiwa</td>
</tr>
<tr>
<td>bomu</td>
<td>'bomb'</td>
<td>bomia</td>
<td>bomisha</td>
<td>bomika</td>
<td>bomiana</td>
<td>bomiwa</td>
</tr>
<tr>
<td>dharau</td>
<td>'despise'</td>
<td>dharaulia</td>
<td>dharaulisha</td>
<td>dharaulika</td>
<td>dharauliana</td>
<td>dharauliwa</td>
</tr>
<tr>
<td>sahau</td>
<td>'forget'</td>
<td>sahaulia</td>
<td>sahaulisha</td>
<td>sahaulika</td>
<td>sahauliana</td>
<td>sahauliwa</td>
</tr>
<tr>
<td>dai</td>
<td>'charge, accuse'</td>
<td>daia</td>
<td>daisha</td>
<td>daika</td>
<td>daiana</td>
<td>daiwa</td>
</tr>
<tr>
<td>rai</td>
<td>'flatter'</td>
<td>raiia</td>
<td>raiisha</td>
<td>raika</td>
<td>raiana</td>
<td>raiwa</td>
</tr>
<tr>
<td>rufai</td>
<td>'mount'</td>
<td>rufaia</td>
<td>rufaisha</td>
<td>rufaika</td>
<td>rufaiana</td>
<td>rufaiwa</td>
</tr>
</tbody>
</table>
The ambivalent status of \( \bar{V} \) is further displayed in the u-final stems in part B. The applied of hof\( \bar{u} \) is hof\( \bar{f}a \). Although the diacritically marked \( \bar{u} \) has disappeared, it again seems to have served as the "stem-final" vowel for the purposes of vowel assimilation since otherwise we should find \( ^{*} \)hof\( \bar{e}a \).

For both groups A and B, then, we might propose that after application of vowel assimilation the stem final \( \bar{V} \) has been deleted, after which the suffix initial 1 finds itself adjacent to a consonant and is deleted. There is a sense, then, in which the stems in A and B act as if they are consonant final. This special stem final \( \bar{V} \) apparently, first "dominates" and replaces the mood marker and, second, dominates the vowel assimilation rule but it is itself dominated and replaced by the variants of the |E-group affixes appropriate for a C-final stem.

Restricting ourselves just to the examples discussed in A and B that have consonants preceding the stem final \( \bar{V} \), an analysis along the above lines permits us to retain the same underlying forms for the |E-group suffixes as were used for the regular vocabulary: |E, |Esh and |Ek. The |E-group forms of the examples in parts A and B simply require the following rule of \( \bar{V} \)-deletion:

\[
V \rightarrow \emptyset / C \quad + \quad |E\)-group suffix containing no archiphonemes
\]

(18)

This statement of the context for \( \bar{V} \)-deletion guarantees that the rule will not apply to the indicative forms in column 1 of Table 3 and that it will be intrinsically ordered after the vowel assimilation rule that converts /E/ into /e/ or /i/. Thus the indicative and causative of hof\( \bar{u} \) can be derived as follows:

\[
\begin{align*}
\text{(19)}& \quad \text{hofu} - \text{a} & \quad \text{hofu} - \text{Esh} - \text{a} & \quad \text{Rule} \\
\text{hofu} & \quad \text{---} & \quad \text{(17) mood deletion} \\
\text{--} & \quad \text{hofu} - \text{lish} - \text{a} & \quad \text{(5) vowel assimilation} \\
\text{--} & \quad \text{hof} - \text{lish} - \text{a} & \quad \text{(18) V-deletion} \\
\text{--} & \quad \text{hof} - \text{ish} - \text{a} & \quad \text{(6) I-deletion} \\
\text{hofu} & \quad \text{hofisha}
\end{align*}
\]

3The descriptive statements of Swahili phonology found in this paper are formulated as consistently as possible in the notational scheme of current phonology [Chomsky and Halle 1968] and reflect the conventional assumption that each lexical and grammatical formative must have a single underlying form. In section 3 of this paper, however, this assumption seems to force a particularly complex analysis which might be resolved by postulating multiple underlying
The reason why the consonant must be part of the environment for $\bar{V}$-deletion in rule (18) is illustrated in parts C and D of Table 3. These words must be analyzed as ending in $\bar{V}$ since as can be seen in column 1, they too cannot be immediately followed by a mood marker. These stems that end in two vowels do not delete the final $\bar{V}$. When the diacritic vowel is $\bar{u}$, the three suffixes here begin with $\bar{u}$, as we would expect by the rules that apply to the Bantu vowel final stems. Thus sahau becomes sahaulia, etc. The verbs that end in $\bar{aI}$, however, do not add $\bar{I}$. Instead the final $\bar{I}$ "becomes" the suffix (or part of the suffix) just as we found in Sections A and B. Thus the applied of daI is daia, which must be morphologically analyzed as da-i-a. Formalization of this effect is admittedly awkward since we must postulate deletion of $/\bar{I}E/ \ (\text{or rather of } /\bar{I}I/) \ \text{only for } \bar{I}-\text{final stems with a preceding vowel.}$

There are no general phonological constraints that might be operative in the language to prevent, for example, sequences of a certain number of vowels or of particular vowel qualities. Trying to make the rule as general as possible, we may formulate the following phonological transformation:

(20) $V \bar{V}_a \bar{V}_a$

1 2 3 $\bar{I}$ $\rightarrow$ 1 4 (If $\bar{V}$ follows a vowel and is followed by a suffix containing the same phonological segment, then delete $\bar{V}$ and $\bar{I}$.)

As stated here, it can only follow the vowel assimilation rule and precede $\bar{V}$-deletion. We delete the vowel 2 rather than 4 because the morphological analysis of, for example, daia must be da-i-a. Although rule (20) may seem awkward and ad hoc formalized in this notation, its effect is not difficult to understand. It simply assumes that any diacritic vowel that looks like a possible $\bar{I}E$-group suffix or part of one (i.e., /i/ or /e/) becomes part of the suffix, otherwise (in the case of /u/), the diacritic vowel becomes part of the stem. The following derivations illustrate the operation of these rules.

forms. Nevertheless we have confidence that the implicit predictions made by the rule formulations found here will prove valid for any newly discovered data.
After vowel assimilation, the syllable deletion rule, (20), directly yields daia. Ripotî, on the other hand, achieves the same effect (i.e., stem final ï appears in the suffix), but by means of a different sequence of rules: (18) and (6). In both cases the stem final ï "becomes" the applied suffix. For the causative or stative, of course, the ï would be suffix initial. Altogether, the three sequences of rules illustrated in (21) (and Table 2) respond to the special properties of the stem-final V by either (a) deleting it (e.g., hofia), (b) incorporating it into the suffix (daia), or (c) incorporating it into the stem (sahauia).

Summarizing the situation for the IE-group suffixes of this class of verbs, then, we find that any time the V looks like the beginning of a IE-group suffix, that is, when it is ï or ë (in sections A and D of Table 3), then it "becomes" part of the suffix. For words ending in ù, this vowel will be deleted if doing so yields a consonant-final stem (Table 3B), otherwise final ù is retained and regular rules for vowel-final stems are followed (Table 3C).

Of course, this analysis is based upon a particular assumption about cognitive economy that is consistent with the analysis in part 2 of this chapter. It assumes that rule governed generation of forms is "easier" than simple memorization in the lexicon. For example, Swahili speakers might instead just memorize that "hof-i-a is the Applied form of hofu". Obviously speakers are capable of such a solution. We have formulated our results in these terms for the sake of consistency and to test the limits of the assumption of constant underlying forms for Swahili verb suffixes.

3.3 Non IE-group suffixes. After the complexity of the IE-group suffixes, the descriptive facts of the non IE-group suffixes, an and w seem quite straightforward and permit us to return to the issue of insertion rules. Comparison of columns 5 and 6 with column 2 in Table 3 reveals that these V-final stems invariably add the usual reciprocal and passive suffixes to a form that
is identical to the applied formative of the word. But just as we found in the case of the passive of Bantu u/o-final stems above, the IE found here does not necessarily have the meaning of the applied morpheme in the basic passive, and the passive remains homophonous with the applied passive. Thus, paralleling the two chukuliwa's in (10) above, we can have both:

(22) a. Daudi a -na -dharau -li -wa usherat i wake
    Daudi he-pres-despise-app-pass lust his
    'Daudi is despised for his lustful behavior'

b. Daudi a -na -dharau -liwa
    Daudi he-pres-despise-pass
    'Daudi is despised'

Similar pairs can be constructed for all the verbs in Table 3.

Thus we apparently need a second rule of IE insertion for (22b), which again inserts the correct morphology for the applied suffix (although without the meaning) between the stem and the an or w suffixes. This rule, formulated so as to precede all previously discussed rules, must be:

(23) \[ \_ \rightarrow \text{IE/\(\bar{V}\)} \text{[w]}_{\text{Passive}} \]

This rule will insert something that will always look identical to the applied suffix before both the reciprocal and passive suffixes but will not do so when a IE-group suffix is already present (since \(\bar{V}\) will no longer be in the context). Notice that the effect of this rule is to make all five productive verb suffixes begin with an underlying IE sequence for the class of foreign verbs with final \(\bar{V}\). The function of this rule can be illustrated with the reciprocal of jaribu 'try, test' and dai 'charge, accuse':

(24) da\(\text{\-}i\)-an-a  jari\(\text{\-}b\)-an-a  Rule
    dai-\(\text{IE}\)-an-a  jaribu-\(\text{IE}\)-an-a  (23)  IE insertion
    dai-\(\text{\-}i\)-an-a  jaribu-\(\text{\-}i\)-an-a  (5)  vowel assimilation
    da -i -an-a  -----  (20)  \(\text{\-}i\)-deletion
    -----  jari\(\text{\-}b\) -\(\text{\-}i\)-an-a  (18)  \(\bar{V}\)-deletion
    -----  jari\(\text{\-}b\) \(\text{\-}i\) -an-a  (6)  \(i\)-deletion
    daiana  jari\(\text{\-}b\)iana

What could the function be of such a rule as (23)? Clearly the answer cannot have much to do with strictly phonological or phonetic properties since, for example, there is nothing phonologically impossible about forms such as *jaribuana (cf. chukuana) or *ripotwa (cf. kokotwa 'drag' + passive)
which would be generated if there were no rule (23). Instead, it seems to us that the regularization of the passive and reciprocal to the pattern of the IE-group suffixes is perhaps a way of "Bantuizing" these foreign stems. One way or another, the language disposes of the peculiar epenthetic vowel \( \overline{V} \). The language thereby "avoids" adding the reciprocal or passive morphology directly onto such a pseudo-segment that was added primarily to render foreign consonant final verbs pronounceable.

Before reviewing our discussion of the special properties of these \( \overline{V} \)-final verbs, we should comment on the absence of any cases of \( \overline{o} \) or \( \overline{a} \). There are some loan words ending in \( \overline{a} \), such as tawala 'rule', but, of course, the \( a \) is treated as the mood marker so that "we don't rule" is ha-\( \overline{t}u \)-tawal-i (cf. (13c)). Thus any potential cases of \( \overline{a} \) turn out to be simply consonant final. We have thus far discovered no cases of stems ending in \( \overline{o} \). Our present analysis predicts, however, that if examples were found, they would behave just like \( \overline{u} \) stems except for a different vowel assimilation output. Thus if a new verb stem like *bat\( \overline{o} \) appeared, its applied and reciprocal forms should be *bataa and *bataana respectively if the present analysis is entirely correct.

To review, then, in somewhat different terms: the special traits of these foreign verbs are that, first, the final \( \overline{V} \) 's seem to replace the mood markers -a, -i, -e . Second, if the verbs end in \( \overline{i} \) or \( \overline{o} \), that vowel becomes part of any other suffix whether or not the suffix normally contains such a vowel. If the stem ends in \( \overline{u} \), then the \( \overline{u} \) will be deleted if preceded by a consonant or retained if preceded by a vowel, and again all suffixes begin with E or IE . It can be seen that the rule of IE insertion (23) required for the passive and reciprocal of this class of verbs has a quite different environment from rule 11 discussed earlier, since it applies before an as well as w . The primary function of the rule also seems to be quite different from the earlier insertion rule. This rule serves to isolate the foreign stem and any possibly epenthetic vowels that go with it (such as the \( \overline{i} \) in rik\( \overline{o} \)I from English 'record') from the native verb suffixes. This morphology is either dropped (in the case of mood) or separated by a "Bantuizing buffer"—the IE sequence.
4. Conclusions

An interesting property of the phonology of Swahili is that nearly all of
the active phonological processes in the language seem to be restricted to par-
ticular morphological items. Just as Shepardson [1982] has shown that there
are many interesting phonological rules that implement the N-class marker on
nouns and adjectives, we have found here a complex set of rules to implement
the various IE-group and inflectional verb suffixes. In dealing with this
problem we have found surprisingly little evidence of completely widespread
"across-the-board" synchronic phonological rules. One example, however, is
the neutralization of certain vowel-glise-vowel sequences with vowel-vowel se-
quencies. Although some of these rules were once completely general (such as
I-deletion), they are synchronically restricted to particular morphological
signals. They have, in fact, become a part of the morphological signal itself.

These results also illustrate several ways in which languages can, in a
sense, create problems for themselves. First, the neutralization of the commu-
icatively crucial distinction of active/passive as a result of I-deletion and
glide neutralization produced a serious problem for the use of the u/o-stem
verbs. We have proposed that speakers may have dealt with this morphological
problem in a variety of ways--one of which was to use the applied-passive form.
As this form became bleached of meaning, a rule of IE-insertion entered the
"phonology" of Swahili.

It seems fair to say that Swahili created another communicative problem
for itself in the treatment of foreign consonant-final verbs. For these words,
an epenthetic vowel is added to the stem rather than the regular Bantu mood-
marking suffixes. So long as these words remain sufficiently "foreign" and are
used only without any IE-group suffixes, this is satisfactory. But as they
became naturalized, speakers needed to employ other verb suffixes and needed
some way to deal with the epenthesized vowels, which partly "belong" to the
stem and partly do not. The complex rules discussed in section 3 of this paper,
including a second rule of IE-insertion, reflect the synchronic solution to
this problem.

Finally, we hope that this paper has achieved a fairly comprehensive
analysis of the morphology of Swahili verb suffixes—a topic that has been inadequately described over the years. Careful treatments of phonological processes such as these which serve a primarily morphological function should help us understand, in its most general form, the potential structure of language.

REFERENCES


